In re Patent Application of:
PHILLIPS ET AL
Serial No. **10/706,211**
Filed: **11/12/2003**

REMARKS

Claims 1 and 7 are pending in this application.

Claims 2-6 have been previously cancelled.

Claims 1 and 7 have been rejected in the outstanding Final Office Action under U.S.C. 103(a) as being unpatentable over Uyama et al. (5,700,550) in view of Coombs et al. (U.S. Patent No. 5,214,530).

It is said in the Office Action that there are features of the claimed invention that are disclosed by Uyama et al. The Examiner indicates that Uyama et al. fail to disclose that the transparent color shifting evaporated layers comprise flakes comprising an absorber layer, a dielectric layer and a reflector layer, and that Coombs et al. disclose an optical variable interference device, which has an observable color change at different viewing angles. The Office Action states that it would be obvious to use the Coombs et al. device which has an absorber layer, a dielectric layer, an absorber layer, a dielectric layer, a reflector, a dielectric layer, an absorber, a dielectric layer and an absorber layer that is broken into flakes, into the transparent color shifting evaporated layers of Uyama et al. It is further alleged that one of ordinary skill in the art would be motivated to do this because Coombs et al. would provide Uyama et al. with additional observable color shift colors making it hard to forge.

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The Office Action further states that Uyama et al. disclose a transparent hologram seal comprising a transparent base member, a release layer, a hologram forming layer, transparent color shifting evaporated layers, a color layer and an anchor layer and an adhesive layer (figure 8). The Examiner further states that Uyama et al. disclose that the hologram forming layer may be formed of thermoplastic resin such as polycarbonate, polystyrene or polyvinyl chloride (col. 5 lines 46-58).

Applicants would respectfully like to draw the Examiner's attention to figures 1 and 8 of Uyama et al. and the teaching regarding these figures.

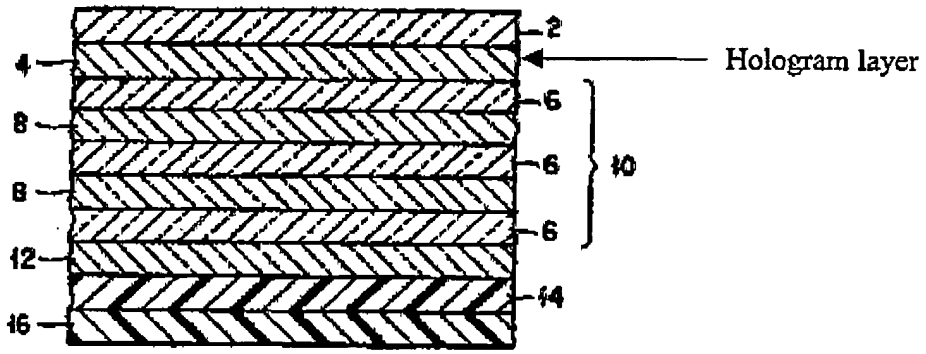

FIG. 1

Within the text of Uyama et al., the following description is given for Fig. 1;

"FIG. 1 is a cross sectional view showing the structure of the first embodiment. **A hologram forming layer 4,**

transparent evaporated layer 10, colored layer 12, adhesion anchor layer 14, and adhesive layer 16 are sequentially laminated on the under surface of a base member 2. **The seal** is affixed to an article by the adhesive layer 16 and **can be observed from above the surface of the base member 2 (upper side in the drawing)**." (emphasis added)

"Since the underlying layer is observed via the base member 2, the base member 2 must be made sufficiently transparent and is preferably formed to have adequate rigidity (flexibility, tensile strength) and surface flatness. **For this reason, the material is not limited to a specified one, but a high polymer film such as a polyester film, or polyolefine film may be used, for example."**

Applicants would like to point out that in the embodiment of Fig. 1, if the hologram itself were impressed or formed on the upper surface of the hologram layer 4 next to base member 2, the hologram itself would not be seen and would disappear, since the refractive index of the transparent polyester film or polyolefin film is very closely matched with the material described for the hologram layer 4 by Uyama et al.

Uyama et al. teach:

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"The hologram forming layer 4 may be formed of thermoplastic resin such as polycarbonate resin, polystyrene resin, or polyvinyl chloride resin,

thermosetting resin such as unsaturated polyester resin, melamine resin, epoxy resin, urethane (meta) acrylate, polystyrene (meta) acrylate, epoxy (meta) acrylate, polyol (meta) acrylate, melamine (meta) acrylate, or triazine (meta) acrylate, a combination of the above materials, or thermoforming resin having a radical polymerization unsaturated radical. Any of the above materials can be used if it can be used to stably form a hologram image. As the hologram image, a relief type hologram image having an image formed of a fine uneven surface is used, but it is not limitative."

For Uyama et al.'s device to function as intended and for the hologram to be seen, the hologram itself would have to be next to the layer 6 of the color shifting coating 10, otherwise the hologram would disappear. In fact, Uyama et al. describe the layer 4 to be a low index layer and the layer 6 to be a high index layer, which of course would enhance the viewing of the hologram, providing the required contrast.

In this office action it states that:

"Applicant further argues that Uyama does not teach that the color shifting coating layer is formed on the second surface of the substrate, opposite the first layer. The Examiner

disagrees, and states by referring to Figure 8 that the hologram layer is on the first surface of the substrate and the color shifting coating is the second surface of the substrate opposite the first surface."

Applicants would like to point out that the Examiner's statement above is understood by the Applicants to imply that the "substrate" is taken to be hologram layer 4, and that the hologram itself is the first (upper) surface and that the color shifting coating is on the second surface of that substrate (hologram layer 4) opposite the first surface (of layer 4).

Firstly, Uyama et al. are silent as to where their hologram itself is located on the hologram layer 4. However, a person skilled in the art, after reading the specification of Uyama et al., would assume that the hologram itself was directly next to the color shifting layer, as putting next to layer 2, in Fig. 1, would make the hologram invisible due to the index matching between the layers.

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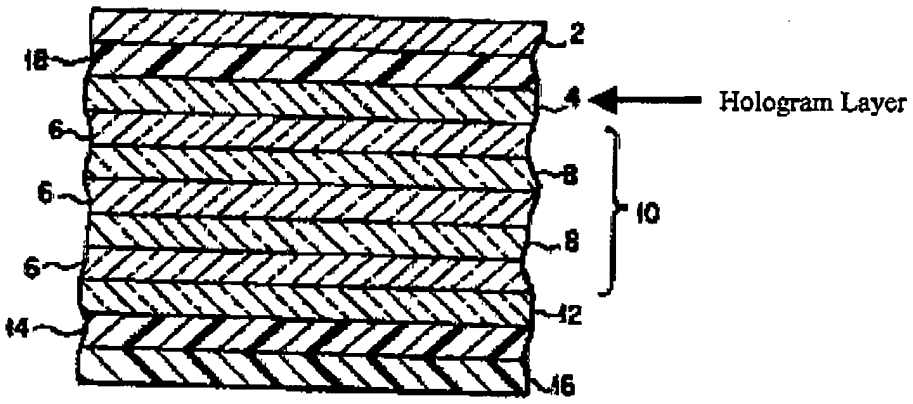

F I G. 8

Referring now to Uyama et al.'s Fig. 8 (above), the teaching is not instructive at all with regard to the location of the hologram structure itself. In fact, layer 18 in Fig 8 next to hologram layer 4 is said to be a releasing layer, however, if one reads the description of Fig. 8 carefully, it is clear that the actual hologram structure would have to be directly next to the color shifting layers 10.

Uyama et al. make the following statement:

"A hologram forming layer 4, transparent evaporated layer 10, colored layer 12, adhesion anchor layer 14, separating or releasing layer 18, and adhesive layer 16 are sequentially laminated on the under surface of a base member 2. Also, in the third embodiment, the colored layer and adhesion anchor layer may be omitted.

Further, in order to protect the hologram forming layer 4 after transfer, a transparent protection layer may be provided between the releasing layer 18 and the hologram forming layer 4. As the protection layer, plastic such as polyolefine, polyvinyl chloride, polyvinylidene chloride, polyvinyl alcohol, or polyethylene terephthalate may be used." (emphasis added)

If one followed this teaching of disposing a protection layer of plastic next to layer 4, and if a hologram were on the upper surface of layer 4, with the color shifting coating on an opposite surface as the Examiner suggests, the hologram would essentially disappear(due to index matching as discussed above)

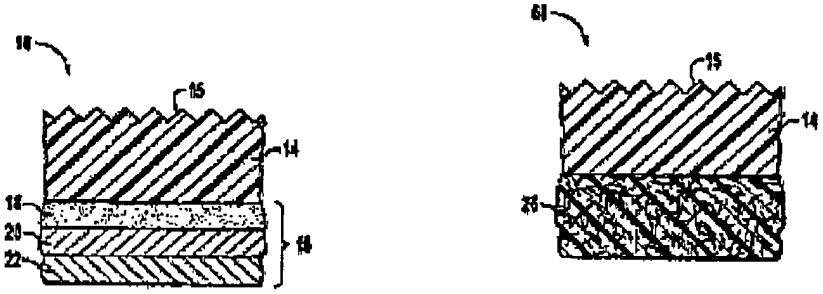

FIG. 3

The drawings (above) from the instant application indicate that the layer having the hologram impressed therein, is substantially thicker than each of the layers making up the color shifting coating, and Applicants show the

grating depth to be orders of magnitude less than the thickness of the layer in which the grating is formed.

By providing such a structure, wherein the hologram itself is spaced a significant distance from the color shifting layers, the hologram has an appearance as if it is floating on a color shifting background. In contrast, Uyama et al.'s hologram has a flat and lackluster appearance, due to the fact that the holographic structure would practically have to be directly adjacent to the weakly color shifting dielectric layers. Applicants' use of a layer of flakes comprising a reflector/dielectric/absorber spaced a significant distance from the hologram is what provides the preferred visual enhanced features over the washed-out appearance of Uyama et al.'s device. It must be noted that all dielectric designs are inferior both in color travel and chroma (color intensity or color saturation) to that of ones based on a metal/dielectric/ absorber.

In order to more clearly differentiate over the teachings of Uyama et al., Applicants have amended the claims.

The instant invention clearly defines two structures on opposite sides of a light transmissive substrate having a substantial thickness compared to the depth of the grating; a hologram or grating on one side and a thin film interference color shifting structure having flakes with a reflector on a second side.

Uyama et al. do not suggest having these two optical structures on opposite sides of a light transmissive substrate. Disposing these structures in this manner has a profound synergistic visual effect. A highly color shifting device is provided wherein the hologram appears to float in space. Furthermore, Uyama et al. are silent as to the relative thickness of his hologram layer. It is shown to be quite thick in the figures relative to the described thickness of the dielectric layers.

Uyama et al. teach a transparent hologram seal that can be applied as a security article. For reasons given above Uyama et al. would place the hologram and color shifting layer on the same side of a light transmissive substrate. The color shifting layer is an evaporation coating layer comprised of alternatively arranged high and low refractive index layers, such that it changes color as light either transmits or reflects through the layer when the viewing angle is changed. The multilayer evaporation layer serves as the color shifting multilayer optical coating. It should be further noted that Uyama et al.'s absence of a reflector layer makes their device inferior to Applicants' embodiment having a reflector layer yielding high chroma. For Uyama et al. to have high chroma their device is best placed on a black background. This requirement is obviated by Applicants' structure by inclusion of an opaque reflective layer within the flakes.

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In contrast to the instant claimed invention, Uyama et al. do not teach that the color shifting coating layer is formed on the second surface of the substrate, opposite to the first surface, (where the hologram layer is formed).

In contrast to the teachings of Uyama et al, Applicants' claims define a structure wherein the microstructural interference pattern is disposed (a predetermined distance) on the other side of the substrate from the color shifting multilayer optical coating overlying the second surface of the substrate.

It should be clearly understood, putting the interference structure on the same or different sides of the substrate is 'not the same'. They have profoundly different visual effects.

There is a significant and unexpected advantage to having this predetermined separation between the microstructure interference pattern and the color shifting coating. It ensures that the color of the hologram will be 'true' and not a result of significant interference between the hologram or microstructural interference pattern with the color shifting coating. Applicant's claimed structure, having the hologram or interference pattern on the first side of the light transmissive substrate with the color shifting coating on the second side, essentially provides a buffer between the

color shifting coating and the interference pattern to obviate or lessen any interaction between the layers. The

physical effect of this is a hologram resulting in a more "true" color (keeps it as a rainbow hologram) and an optical effect wherein the hologram seems to be floating on or above its background. The resulting image appears to allow the viewer to look behind or around the hologram. The structure taught by Uyama et al. simply does not provide these advantages.

A hologram, which preserves its integrity in the presence of a thin film color shifting coating, is provided by the instant invention as defined in amended claim 1 as shown above. This has advantages over all of the structures proposed by Uyama.

Because the instant invention requires placing the interference filter, such as a hologram, on the opposite side of the substrate from the color shifting filter, a different optical effect is achieved than placing it on the same side with the hologram. The thickness of the substrate, for example PET, typically of 12 to 25 microns, is sufficiently thick that one can see "under", i.e., "around and under" the hologram to view the color shifting filter. This parallax advantageously gives the hologram an appearance of floating over a background of a color shifting coating that one does not have if both hologram and thin film filter are on the same side of the PET substrate.

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Uyama does not explicitly state or show an embodiment wherein the OV coating and the hologram or grating pattern are on opposite sides of a substrate.

Amended claims 1 and 7 are now believed to be patentable.

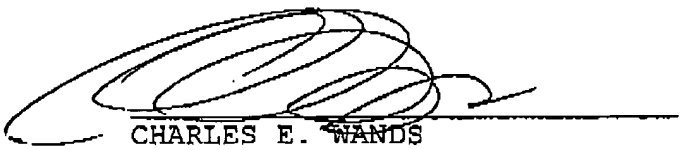
In view of the foregoing remarks and amendments to the claims, it is respectfully submitted that the instant application is now in condition for allowance.

Early and favorable reconsideration of the Examiner's objections would be appreciated.

Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 50-1465 and please credit any excess fees to such deposit account.

Respectfully submitted,



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